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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

William D. Abraham

Group Art Unit: 1764

Serial No. 10/077,416

Examiner: Ellen M. McAvoy

Filed: February 15, 2002

For: MOLYBDENUM, SULFUR AND BORON CONTAINING LUBRICATING OIL COMPOSITION

DECLARATION UNDER 37 C.F.R. 1.132

I, William D. Abraham, declare and state the following:

(1) I received the degree of PhD. in chemistry from the University of Pittsburgh in 1990. I have been employed by The Lubrizol Corporation, the assignee of the above-identified application, since 1990. My title at Lubrizol is Principle Research Scientist and Technology Manager for the Engine Oil Product Development Group. I consider myself to have expertise in the field of lubricant chemistry.

(2) I am familiar with the invention disclosed in the above-identified patent application.

(3) The tests described below were conducted at The Lubrizol Corporation at my direction.

(4) Table A below discloses Example I which is an ILSAC GF-4 lubricating oil composition within the scope of the invention. Example C-I, which is outside the scope of the invention but provided for comparative purposes, is also disclosed in Table A. In Table A all numerical values relating to ingredients of the exemplified lubricating oil

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compositions (except for the Mo, B and anti-foam agent concentrations) are in percent by weight of the lubricating oil composition. The Mo, B and anti-foam agent concentrations are in parts per million (ppm). The molybdenum, boron and phosphorus concentrations are theoretical.

(5) The exemplified lubricating oil compositions are tested using the GF-3/GF-4 Sequence VIII Bearing Corrosion Engine Test and the results of these tests are disclosed in Table A. This test is designed to evaluate crankcase lubricant oils for their copper and lead corrosion control capabilities. The results are reported in milligrams of total weight loss of the top and bottom crankshaft bearings. The lower the weight loss, the better. The pass/fail limit may be considered to be 26.4 mg.

Table A

Example	C-I	I
Group II base oil	84.40	84.05
Viscosity modifier: ethylene-propylene copolymer (94% diluent oil)	5.0	5.0
Pour point depressant: Polymethacrylate polymer dispersed in oil (25% diluent oil)	0.15	0.15
Dispersant: Polyisobutene ($M_n=2000$) substituted succinimide (45% diluent oil)	5.1	5.1
EP Additive: two zinc dialkyl dithiophosphates dispersed in oil (8.3% diluent oil)	0.86	0.86
Antioxidant: Nonylated diphenyl amine	0.8	0.8
Antioxidant: Sulfurized olefin from Diels Alder reaction of butadiene and butyl acrylate	0.2	0.2
Antioxidant: Hindered phenolic ester	1.0	1.0
Friction modifier: glycerol monooleate	0.2	0.2
Detergent: calcium sulfonate dispersed in oil, TBN = 300 (42% diluent oil)	0.88	0.88
Detergent: calcium sulfonate	0.65	0.65

dispersed in oil, TBN = 400 (42% diluent oil)		
Diluent oil	0.61	0.61
Anti-foam agent: polydimethyl siloxane (87.5% diluent oil) (ppm)	90	90
Sakuralube 515 (product of Asahi Denka identified as molybdenum dithiocarbamate derived from a mixture of bis-2-ethyl hexyl amine and bis-tridecyl amine, a molybdenum compound and carbon disulfide dispersed in oil, 10% Mo, 45% oil)	0.15	0.15
Tri-2-ethyl hexyl borate	—	0.35
Mo concentration (ppm)	150	150
Boron concentration (ppm)	----	90
Phosphorus concentration	750	750
Viscosity Grade	5W-20	5W-20
GF-3/GF-4 Sequence VIII (mg)	53 mg	13.5 mg

(6) The foregoing examples show significant improvement in the GF-3/GF-4 Sequence VIII results when the tri-2-ethyl hexyl borate is added.

I, William D. Abraham, declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.



William D. Abraham

Date: 7/31/03